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DD/ST# 2821-68

17 July 1968

MEMORANDUM FOR: Executive Director-Comptroller

THROUGH : Deputy Director for Science and Technology

SUBJECT : Replacement for the IBM 360/50 Time
Sharing Computer System

1. This memorandum contains a request for guidance in paragraph 13, prior to acquisition of computer equipment.

2. Among the several computers in OCS is an IBM System 360, Model 50 which was purchased last year with the understanding that it would be turned over to the Clandestine Services early in calendar year 1969. It is time now to consider the system to replace that 50 in OCS, since IBM must be given sufficient lead time to ensure delivery of the replacement system. We have investigated 11 alternatives which could be considered compatible with our production systems, and have briefly considered, and rejected, six others which are not.

3. Time-sharing is one of the major capabilities of the current generation of computers. It allows multiple users at terminals, which can be placed at locations remote from the computer files, to engage in a "dialogue" with those files -- each user has the impression that he has the system entirely to himself. His inquiry is answered by a typewriter printout or a television-terminal-like display almost as fast as he can enter the question; the response enables him to refine his question or seek additional information.

4. There is no doubt in my mind, nor, I hope, in the minds of others, that CIA should have a time sharing capability. The question is: how much of one, how soon? There are, currently, several good applications: security name-checking [   ] mathematical computations for OEL and other engineers; on-line debugging of newly written computer programs; COINS; etc. There are other, softer, "requirements." What is certain is that requests will follow demonstrated capability. We need to provide for both developmental work and operational support.

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5. One serious consideration, particularly for COINS, is the security problem that exists when different terminals querying different files are linked with one computer--or, in a non-time sharing system, when more than one program is running on one machine (multitasking). In either case, it is possible that information from one file might be printed out, or displayed, to a customer querying another file. We have proposed a solution which we think will work, but can't claim 100% certainty; others, including ARPA, are working on the problem. But, at the moment, the Office of Security feels constrained to say that when administratively sensitive files or multi-level security files are on a particular computer, that computer cannot be used by non-Agency people in the COINS network, nor, in most circumstances, can it be time shared within the Agency unless the sensitive files are removed.

6. A very serious consideration is qualified people -- and enough of them to ensure that time sharing developments don't occur at the expense of other operational programs, and modifications thereto. I am not now concerned about _slots_, but the right guys. There just aren't very many people with the ability to develop time sharing systems -- in fact, within this Office there is really only one man who understands the OCS time sharing system in depth, and he is the one who developed it. Further, he has not had time to document what he has built. There are systems that were developed outside which, though still complex, would require something less than the unique talent alluded to above -- and this is a factor to consider, even though most of the non-Agency systems still have serious drawbacks. Two of direct interest are System Development Corporation's ADEPT program, which ORD will be testing, and Lincoln Lab's Command Program (CP), which looks very good with the IBM 360/67 computer.

7. The eleven alternatives considered range in monthly rental costs from $37,280 (for an RCA Spectra 70/46) to $66,981 (for an IBM 360/67), with the average around $54,000. The present 360/50 system, as noted, has been purchased, but a monthly rental figure for it would be about $52,000. No single system, at the moment, would have Security's blessing, particularly if used for COINS, unless during prime shift COINS use, all other jobs were removed from the system -- a costly accommodation in terms of impact on Computer Center operations.

8. The alternatives with which I am wrestling boil down, in my mind, to two: the 360/67, or a 360/50 (replacing those items transferred to DDP) _plus_ acquisition of a 360/40 for COINS. The 50/40 complex

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would rent for $58,000 per month, the COINS 40 cost of which would be about $17,700. My difficulty in choosing between the two stems from the fact that the 360/67 has real advantages from a technical standpoint and does represent the forward step which we will probably take in about a year anyway; the more conservative 50/40 alternative is less expensive, would more closely satisfy Security and is equipment we have used.

9. The 360/67 is working, is available and meets all of our objectives except that of the Office of Security to avoid putting all time-shared files on one physical piece of equipment. But on this point it has a new feature which is hard to describe in lay terms, called the virtual machine concept, in which one machine system can be made to act as if it were several "virtually separate" machine systems, with special hardware features to protect each such from the others. This capability, which has not yet been investigated by the Office of Security, has, we feel, a higher probability of error protection than the electronic <u>communication</u> systems now in use with Security approval. The cost of the 67 is within planned budgetary limits and, though higher, is not disturbing since the reserve of power could be put to good use in supplementing the normal job processing (batch processing) equipment already in the Center. Conversion to the 67 is fairly simple; both experimentation and production can be done on one machine. <u>But</u>, adequate manpower resources must be provided for this more complex system and, even now, time sharing developments are competing with other teleprocessing work, i.e., we might have to sacrifice other activities to devote resources to exploit the 67.

10. The 50/40 combination is safer and perhaps eases the manpower picture, although it does increase the total number of systems by one. [It should be noted that if the individual who developed our 50 system should be unavailable for any reason, we would have to backstop him with others so the net advantage here is conditioned by our dependence on one man.] The 50/40 is less expensive -- by about $9000/month. And, being less ambitious, more closely jibes with the known time sharing requirements picture today. (Again noting that OCS objectives and resources would, in all probability, be the controlling factor in user requirements definition). On the security side, it provides an easier solution, but it also, in truth, only puts off the security question-- it does not answer it. Economics would force another look later.

11. If we go with the 50/40 combination, we should review the situation again in the Fall of 1969 or when the fourth 360/65 system (or

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equivalent) is being considered. This would leave some major options open without bending the objective of system stability too far. The 50 would remain a viable system for about a year, and effort invested to further develop services would not be wasted.

12. Among the OCS senior officers there is a clear split between the hardware/software people and the applications people, the former (including my Computer Science Advisor, the Advanced Projects Staff Chief and the Director of the Computer Center) favoring the 67. My deputy, with stated reluctance, suggests the 50/40 to avoid sacrificing other activities. My intuition says to go 67; my Scotch Presbyterian heritage says 50/40.

13. Having reduced the considerations to two, I frankly seek management guidance on Agency time sharing direction, to determine which of the two systems to procure. Considerable documentation exists reflecting the investigations conducted and judgements made; these, obviously, are available should you wish them. [   ] has a copy   25X
of the basic study.

/s/ Charles A. Briggs

CHARLES A. BRIGGS
Director of Computer Services

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Recommendation/Comment: [   ]

Deputy Director for Science and Technology

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Although the above memo is more lengthy than I normally
like to forward, I believe it is well that you get this
rather detailed summation of the problem. I must admit
that this appears to be a real toss-up and I have no
strong feelings as to which is the best course of action.
On balance, I believe that the 360/67 option is the better
choice.